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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/738,316	12/17/2003	Seong-Ho Kim	5649-1172	7927
7590 09/16/2005			EXAMINER	
Robert M. Meeks Myers Bigel Sibley & Sajovec Post Office Box 37428 Raleigh, NC 27627			NGUYEN, TUAN H	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 09/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

**Office Action Summary**

Application No.

10/738,316

Applicant(s)

KIM ET AL.

Examiner

Tuan H. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 July 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 12-17 is/are rejected.
- 7) ☒ Claim(s) 10 and 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>4/04, 12/04</u>   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5, 7, 8, 15-17 rejected under 35 U.S.C. 102(b) as being anticipated by Isao (Jap. Pat. No. 04-093080, submitted by applicant).

See Isao, figs. 1(a)-1(e) and related abstract which discloses the claimed semiconductor device including a semiconductor substrate having a hemispherical or elliptical recess therein; a gate insulator film 11 on the substrate in the recess; a gate electrode 12A comprising a first portion on the gate insulator 11 in the recess and a second reduced-width portion extending from the first portion; and a source/drain lightly doped region 17A, 17B in the substrate adjacent the recess.

With respect to claim 5, figs. 1(d) and 1(e) show an insulation layer 14 on the surface of the substrate adjoining the second portion of the gate electrode 12A and extending over a portion of the first portion of the gate electrode; and an insulating spacer 16A, 16B disposed on a sidewall of the second portion of the gate electrode and on the insulation layer 14.

With respect to claim 7, insulation spacer 16 is considered as a first and second insulation spacers of the same material.

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With respect to claim 8, fig. 1(e) shows a lighter doped region 15 adjoining the recess.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 3, 9, 12-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Park et al..

See Park et al., figs. 1-8 and related text on col. 3-4 which discloses the claimed semiconductor device including a gate insulator 20 on the substrate 12 in the recess; a gate electrode 21 having a first portion on the gate insulator and a second reduced-width portion extending from the first portion; a lightly dope source/drain region 15 adjoining the first portion of the gate insulator which is nearer the recess, and source/drain region 16 in the substrate 12 adjacent the recess.

With respect to claims 2, 3, fig. 8 shows the gate insulator comprises a first portion 18 disposed on the sidewall of the recess and having a first thickness, and a second portion 20 disposed on a bottom of the recess and having a second thickness less than the first thickness. The first portion 18 of the gate insulator adjoins a source/drain region 16.

With respect to claim 9, fig. 8 shows the gate electrode 21 further comprises a third portion 22 having a greater width than the second portion.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Isao as applied to claims 1, 5, 7, 8, 15-17 above, and further in view of Lyons et al. (admitted prior art).

Isao as explained above lacks anticipation of forming a nitride layer between the gate insulator layer and the gate electrode, and insulating spacer of nitride.

Lyons as disclosed in the Background of the invention, teaches the use of either oxide or nitride as gate dielectric 64 and spacer 76 (see Lyons, col. 4, last paragraph and col. 6 first paragraph).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used either oxide or nitride as suggested by Lyons in Isao process for forming a semiconductor since oxide and nitride are well-known equivalent dielectric material in semiconductor art.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Dhong et al. and Hueting et al. discloses MOSFET with gate having thick and thin portions in recess.

***Allowable Subject Matter***

Claims 10-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

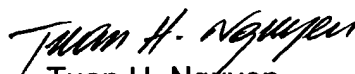
The following is a statement of reasons for the indication of allowable subject matter: None of the references of record teaches or suggests the claimed semiconductor device including an insulating layer disposed on a sidewall of the second and third portions of the gate electrode and on the insulation layer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan H. Nguyen whose telephone number is 571-272-1694. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tuan H. Nguyen  
Primary Examiner  
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